I CLAIM:

1. A process for producing liquified natural gas comprising:

(A) operating a gas cooling loop by (1) contacting a natural gas stream with a return stream of the gas cooling loop to form a combined stream, wherein the natural gas stream comprises methane and heavier hydrocarbons, and the return stream comprises methane, (2) passing the combined stream through a first zone of a heat transfer zone and then to a gas cooling loop first gas/liquid separation zone forming a first separation zone gas stream comprising methane and a gas cooling loop first separation zone liquid stream comprising heavier hydrocarbons, (3) passing the first separation zone gas stream through an expansion zone, then through a second zone of the transfer zone, then through the first zone of the heat transfer zone, and then through a compression zone to form the return stream of the gas cooling loop;

(B) taking the gas cooling loop first separation zone liquid stream as a distillation zone feed stream, and distilling this distillation zone feed stream into a

distilled gas stream comprising methane and a bottom stream comprising heavy hydrocarbons;

(C) operating an LNG cooling loop by (1) passing a return stream of the LNG cooling loop to a compression zone to form a compressed stream, (2) passing the compressed stream thru the first zone of the heat transfer zone and then through an expansion zone to form a first expanded stream, (3) combining the first expanded stream with the distilled gas stream from Step (B) to form a combined LNG stream, (4) splitting the combined LNG stream into a first return LNG stream and a first remaining LNG stream, (5) expanding and passing the first return LNG stream thru the first zone of the heat transfer zone and then back to the compression zone, (6) passing the first remaining LNG stream through the second zone of the heat transfer zone and then splitting it into a second return LNG stream and a second remaining LNG stream, (7) expanding and passing the second return LNG stream through the second zone of the heat transfer zone, through the first zone of the heat transfer zone, and then back to the compression zone, (8) passing the second

remaining LNG stream through a third zone of the heat transfer zone and then splitting it into a third return LNG stream and a third remaining LNG stream, (9) then expanding and passing the third return LNG stream through the third zone, the second zone and then the first zone of the transfer zone to form the return stream of the LNG cooling loop, and (10) passing the third remaining LNG stream to LNG storage and recovering any LNG vapors as an LNG boiloff stream and combining the boiloff stream with the return stream of the LNG cooling loop, and recovering LNG product from LNG storage as an LNG product stream.

2. The process of claim 1, further comprising:

in step (A), prior to contacting the natural gas stream with a return stream of the gas cooling loop, first removing any liquids from the natural gas stream, which liquids are then combined with the distillation zone feed stream of step (B)

3. The process of claim 1, further comprising:

removing a portion of the first separation zone gas

stream of step (A) as a side stream;

expanding the side stream and separating it into a gas side stream and a liquid side stream;

combining the liquid side stream with the distillation zone feed stream of step (B); and

passing the gas side stream through the second portion of the heat transfer zone and combining it with the first expanded stream and the distilled gas stream from Step (B) to form the combined LNG stream.

4. A process for producing liquified natural gas comprising:

(A) operating a gas cooling loop by (1) contacting a natural gas stream with a return stream of the gas cooling loop to form a combined stream, wherein the natural gas stream comprises methane and heavier hydrocarbons, and the return stream comprises methane, (2) passing the combined stream through a heat transfer zone and then to a gas cooling loop first gas/liquid separation zone forming a first separation zone gas stream comprising methane and a gas cooling loop first

separation zone liquid stream comprising heavier hydrocarbons, (3) passing the first separation zone gas stream through an expansion zone, then through the transfer zone, and then through a compression zone to form the return stream of the gas cooling loop;

(B) taking the gas cooling loop first separation zone liquid stream as a distillation zone feed stream, and distilling this distillation zone feed stream into a distilled gas stream comprising methane and a bottom stream comprising heavy hydrocarbons;

(C) operating an LNG cooling loop by (1) passing a return stream of the LNG cooling loop to a compression zone to form a compressed stream, (2) passing the compressed stream thru the heat transfer zone and then through an expansion zone to form a first expanded stream, (3) splitting the first expanded stream into a first return LNG stream and a first remaining LNG stream, (4) expanding and passing the first return LNG stream through the heat transfer zone and then back to the compression zone, (5) passing the first remaining LNG stream through the heat transfer zone and then splitting

it into a second return LNG stream and a second remaining LNG stream, (6) expanding and passing the second return LNG stream through the heat transfer zone, and then back to the compression zone, (7) passing the second remaining LNG stream through the heat transfer zone and then splitting it into a third return LNG stream and a third remaining LNG stream, (8) then expanding and passing the third return LNG stream through the transfer zone to form the return stream of the LNG cooling loop, (9) passing the third remaining LNG stream to LNG storage and recovering any LNG vapors as an LNG boiloff stream and combining the boiloff stream with the return stream of the LNG cooling loop, and recovering LNG product from LNG storage as an LNG product stream, and (10) introducing the distilled gas stream from Step (B) into the LNG cooling loop

5. An apparatus for processing natural gas, the apparatus comprising:

a gas cooling loop unit comprising, a natural gas inlet line for receiving the natural gas, a heat exchange

zone, a gas/liquid separation zone having a gas exit line and a liquid exit line, an gas cooling loop expansion zone, and a gas cooling loop compression zone, and gas cooling loop piping defining a gas cooling loop flow path suitable to allow the received natural gas from the inlet line to be combined with a gas cooling loop recycled gas from the compression zone and flow, through a first path through the heat exchange zone, to the gas/liquid separator wherein any condensed liquid exits through the liquid exit line, and any remaining gas exits through the gas exit line, with the remaining gas then passing through the expansion zone, through a second path through the heat exchange zone, through the compression zone to be recycled back as the gas cooling loop recycled gas;

a distillation unit having an inlet, a gas outlet, and a liquid outlet, wherein the inlet is connected to the gas cooling loop liquid exit line;

an LNG cooling loop unit, an LNG compression zone, the heat exchanger zone, an LNG expander, an LNG recovery

unit, and LNG piping defining an LNG cooling loop path suitable to allow a compressed LNG boiloff gas and a third LNG recycle gas to be combined into a combined gas which flows through the LNG compression zone, through a third path through the heat exchange zone, through the expander, and through a first LNG splitter and split into a first LNG recycle gas and a first LNG remaining gas, with the first remaining gas flowing through a fourth path through the heat exchange zone, and through a second LNG splitter and split into a second LNG recycle gas and a second LNG remaining gas, with the second remaining gas flowing through a fifth path through the heat exchange zone, and through a third LNG splitter and split into a third LNG recycle gas and a third LNG remaining gas, with the third LNG remaining gas passing through the distillation unit, and distilled into the compressed LNG boiloff gas and an LNG product, with the first LNG recycle gas passing through a sixth path through the heat exchange zone and recycled through the compression zone, with the second LNG recycle gas passing through a seventh path through the heat exchange zone and recycled through

the compression zone, and with the third LNG recycle gas passing through a eighth path through the heat exchange zone and recycled to be combined with the LNG boiloff gas,

wherein the distillation gas outlet is connected to the LNG cooling loop.

6. The apparatus of claim 6, wherein the distillation gas outlet is connected to the LNG cooling loop immediately prior to the fourth path through the heat exchanger zone.

7. An apparatus for processing natural gas, the apparatus comprising:

a gas cooling loop unit comprising, a natural gas inlet line for receiving the natural gas, a heat exchange unit having first, second, and third zones, a gas/liquid separation zone having a gas exit line and a liquid exit line, an gas cooling loop expansion zone, and a gas cooling loop compression zone, and gas cooling loop piping defining a gas cooling loop flow path suitable to

allow the received natural gas from the inlet line to be combined with a gas cooling loop recycled gas from the compression zone and flow, through a first path through the first zone of the heat exchange unit, to the gas/liquid separator wherein any condensed liquid exits through the liquid exit line, and any remaining gas exits through the gas exit line, with the remaining gas then passing through the expansion zone, through a second path through the second zone and then first zone of the heat exchange unit, through the compression zone to be recycled back as the gas cooling loop recycled gas;

a distillation unit having an inlet, a gas outlet, and a liquid outlet, wherein the inlet is connected to the gas cooling loop liquid exit line;

an LNG cooling loop unit comprising, an LNG compression zone, the heat exchanger unit, an LNG expander, an LNG recovery unit, and LNG piping defining an LNG cooling loop path suitable to allow a compressed LNG boiloff gas and a third LNG recycle gas to be

combined into a combined gas which flows through the LNG compression zone, through a third path through the first zone of the heat exchange unit, through the expander, and through a first LNG splitter and split into a first LNG recycle gas and a first LNG remaining gas, with the first remaining gas flowing through a fourth path through the second zone of the heat exchange unit, and through a second LNG splitter and split into a second LNG recycle gas and a second LNG remaining gas, with the second remaining gas flowing through a fifth path through the third zone of the heat exchange unit, and through a third LNG splitter and split into a third LNG recycle gas and a third LNG remaining gas, with the third LNG remaining gas passing through the distillation unit, and distilled into the compressed LNG boiloff gas and an LNG product, with the first LNG recycle gas passing through a sixth path through the first zone of the heat exchange unit and recycled through the compression zone, with the second LNG recycle gas passing through a seventh path through second zone and then first zone of the heat exchange unit and recycled through the compression zone, and with the

third LNG recycle gas passing through a eighth path through the third zone, then second zone, and then first zone of the heat exchange unit and recycled to be combined with the LNG boiloff gas,

wherein the distillation gas outlet is connected to the LNG cooling loop unit.